AND9029

Hybrid Jig User Manual

ON Semiconductor®

http://onsemi.com

APPLICATION NOTE

Introduction

ON Semiconductor's hybrid jig was designed to enable customers to evaluate new products, perform incoming QC and failure analysis on preconfigured products in a simple and convenient way, without having to wire the units.

This document is intended to be a quick start guide for using the hybrid jig. The board is designed with two components: a universal hybrid board and an adapter module. The universal hybrid board is intended to provide a consistent layout for all hybrids regardless of pin−out to simplify evaluation when using multiple products. The adapter module acts as an interface with the specific hybrid and routes the various pins to the appropriate location on the universal hybrid board.

NOTE: Not all hybrids will utilize all of the functionality of the universal hybrid board. For example, the RHYTHM™ product (SB3229/R3910) does not bring out the VDD2X line so this pin on the universal hybrid board would not be used.

Reference Documents

Please refer to specific product's user's guide (if available). The following other documents can also be used as reference:

- Universal Customer Hybrid Test Jig Schematic (Figure 2)
- SA3400/3404/3405 HYB−JIG Board Schematic (Figure 3)
- Using DSP Hybrids in High Power Applications Initial Design Tips information note (AND9028)

Illustrations and Schematics

An illustration of the hybrid jig for Rhythm R3110 is shown in Figure 1.

NOTE: All location descriptions throughout this document are described from this orientation.

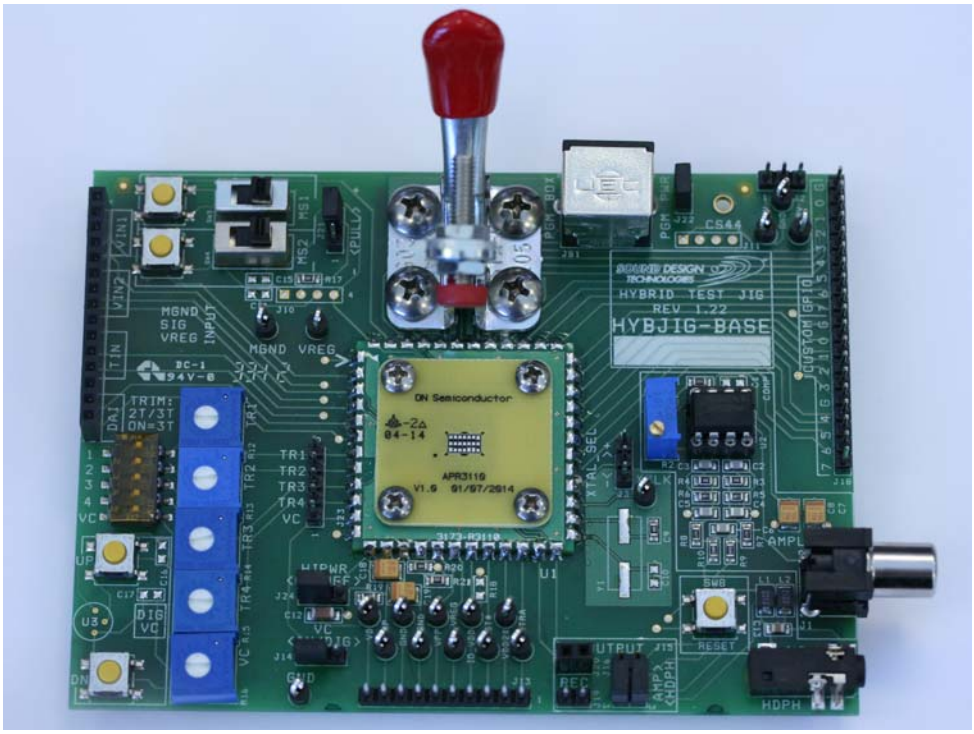

Figure 1. Hybrid Jig

© Semiconductor Components Industries, LLC, 2014

The schematic for Wolverine universal hybrid board is shown in Figure 2.

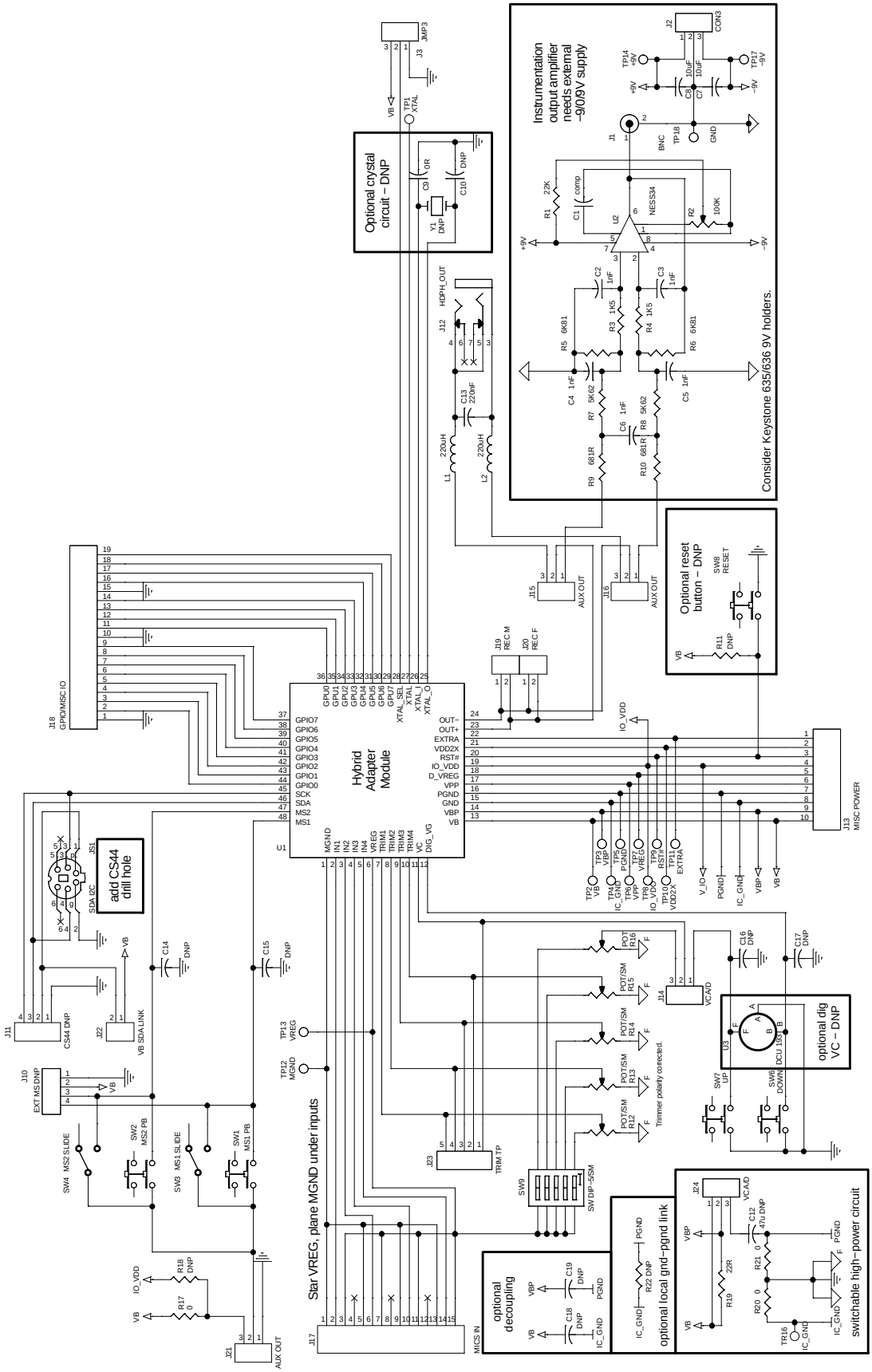
Hybrid Adapter Module
Optional crystal circuit – DNP
Instrumentation output amplifier needs external –9/0/9V supply
Consider Keystone 635/636 9V holders.
Optional reset button – DNP
add CS44 drill hole
Star VREG, plane MGND under inputs
optional decoupling
optional local gnd–pgnd link
switchable high–power circuit
optional dig VC – DNP
Trimmer polarity corrected.

Figure 2. Hybrid Jig Schematic

The adapter module schematic for the SA3405/SA3404/SA3400 (Rhythm and Wolverine open platform hybrid) is shown in Figure 3.

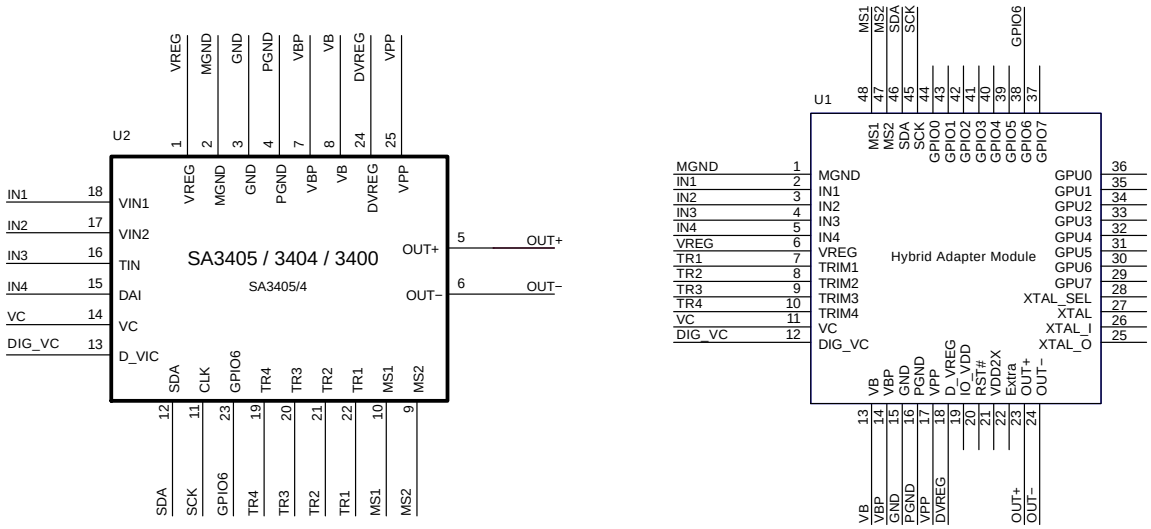

Figure 3. Rhythm Adapter Module

Inserting and Extracting the Hybrid

To insert the hybrid, raise the red handled plunger in the centre of the board to gain access to the hybrid socket alignment plate. Hybrids should be inserted face down, with pin 1 in the bottom left.

NOTE: Pin 1 is denoted by a dot on the underside of the hybrid in accordance with its respective datasheet.

Once inserted, the hybrid I/O pads touchdown on the adapter module through a pressure sensitive conductive membrane. Finally, close the plunger which will apply pressure against the hybrid with the membrane. The plunger should only apply a small amount of pressure to the hybrid and fine adjustments can be made by adjusting the two washers on the plunger head. The amount of pressure should be similar to firmly yet gently pressing on the hybrid with a finger.

To extract the hybrid, gently pull on one of the hybrid corner with ones fingers, use an electronics vacuum pen, or insert tweezers in the extraction holes of the alignment plate. Care should be taken not to puncture the membrane with tweezers.

Inputs

The universal hybrid jig supports up to four inputs, labelled IN1−IN4, on the upper left corner of the board. The input orientation (MGND, signal, VReg) is listed on a legend in the silkscreen in the same general area. The inputs can be identified by referencing the adapter module schematic. For example, the Rhythm adapter module in Figure 3 shows that IN1 through IN4 are, respectively: MIC1, MIC2, TIN, DAI.

Outputs

There are three possible output settings on the universal hybrid jig: receiver, headphones, and OpAmp. Using the headphones requires J15 and J16 to be jumpered on pins 2−3 as illustrated in and 1⁄8 inch headphones to be inserted in J12. To use the OpAmp, change the jumpers on J15 and J16 to short pins 1−2 and apply ±9 V on the test loops in the upper right corner of the board. To use the receiver, it is recommended to remove the jumpers from J15 and J16, to remove the LC low−pass filter effects, and to insert the receiver into either the male or female 2−pin header on J19 or J20. A summary of the configuration options is provided in Table 1.

Table 1. JUMPER CONFIGURATIONS for Output Circuit on J15 and J16

Configuration	Jumper Pins	Jumper Positioning
OpAmp	1−2	Top of board/AMP
Headphones	2−3	Bottom of board/HDPH
Receiver	Open	N/A

Power Options

Power is supplied from the programming box on the 6−pin mini−DIN connector, directly on J22, or through the optional CS44 socket. When powering from the 6−pin mini−DIN connector, J22 must be shorted. When powering directly from J22, remove the jumper and connect 1.3 V to pin 1. When using the optional CS44 connector, it is necessary to wire a 4−pin header or CS44 connector to

OTP_CS44. The pin orientation is listed on the underside of the universal hybrid board.

The universal hybrid board is setup with the high power application circuit, described in the Using DSP Hybrids in High Power Applications Initial Design Tips information note (AND9028). It can be enabled and disabled according to Table 2.

NOTE: One of these jumper configurations must be selected to tie VB and VBP together; otherwise, they will have to be powered separately.

Table 2. JUMPER CONFIGURATIONS for High Power Circuit on J24

Configuration	Jumper Pins	Jumper Positioning
High power circuit disabled	1−2	Top of board/HIPWR ON
High power circuit enabled	2−3	Bottom of board/HIPWR OFF

Volume Control and Trimmers

General Configuration

The volume control and four trimmers can be setup in 2−terminal or 3−terminal configurations through SW9. As listed on the silkscreen, turning a switch off or on will enable 2−terminal or 3−terminal mode, respectively, for its corresponding trimmer or volume control.

NOTE: For Wolverine based products, the switch must be set to 3−terminal mode.

Each trimmer and volume control has a correspondingly identified wiper and test point.

Volume Control

The volume control can be used in their analog or digital mode. This is controlled by the selection of J14 according to Table 3. The analog volume control is operated through the VC wiper, whereas the digital volume control is operated through SW7/UP and SW6/DN.

NOTE: U3 can be populated with a user specific digital volume control and C16/C17 can be populated with capacitors to reduce switch noise and de−bounce.

Table 3. JUMPER CONFIGURATIONS for Volume Control Circuit on J14

Configuration	Jumper Pins	Jumper Positioning
Digital volume control	1−2	Bottom of board/VC DIG
Analog volume control	2−3	Bottom of board/VC AN

Memory Select

The universal hybrid jig supports both momentary and static switches on MS1 and MS2. Setting J21 will define whether the two memory selects are configured as pull−up or pull−down according to Table 4.

NOTE: When using the momentary switches, leave the static switches in the off position.

As well, J10 can be populated with a header to allow alternate memory selects to be incorporated and C14/C15 can be populated to reduce switch noise and de−bounce.

Table 4. JUMPER CONFIGURATIONS for Memory Select Pull Options on J21

Configuration	Jumper Pins	Jumper Positioning
Pull down	1−2	Top of board/ PULL +
Pull up	2−3	Bottom of board/ PULL −

Programming

Programming through SDA or I^2C can be done on the 6−pin mini−DIN connector or through the optional CS44 connector. The CS44 connector needs to be populated on OPT_CS44.

Reset

A reset button allows for quick reset of the hybrid by pressing SW8 on the bottom right corner of the board. The hybrid will resume processing when the button is released.

Test Points

The universal hybrid board contains various test points. Most notably, J13 interfaces with the power lines as noted on the silkscreen traces. For example, the leftmost pin is a test point for VB. There are also drill holes to insert optional test loops.

There are also test points for trimmers and the volume control on J23 (left side of the board), and test loops for MGND, VREG, and XCLK.

Custom/GPIO

Header J18 (upper right corner) allows for connections to hybrids supporting GPIOs and other custom pins that may be identified and brought out at a later date. The header is sectioned off on the silkscreen to separate the GPIO and custom pins. Each individual pin is then identified along with a ground pin, denoted as ‘G’, for each of the sections.

External Crystal Circuit

Some hybrids may support an external oscillator option and so the universal hybrid jig supports this functionality. This is contained in the XTAL_SEL section of the board. For such hybrids, the crystal and capacitors can be populated on Y1 and C9−10, respectively.

RHYTHM is a trademark of Semiconductor Components Industries, LLC.
ON Semiconductor is licensed by Philips Corporation to carry the I^2C Bus Protocol.

ON Semiconductor and ON are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
Fax: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800−282−9855 Toll Free USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81−3−5773−3850

ON Semiconductor Website: **www.onsemi.com**

Order Literature: http://www.onsemi.com/orderlit

For additional information, please contact your local Sales Representative

AND9029/D